

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)									DATE June 2001	
BUDGET ACTIVITY 03 - Advanced Technology Development					PE NUMBER AND TITLE 0603726F Aerospace Info Tech Sys Integration					
COST (\$ in Thousands)	FY 2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	Cost to Complete	Total Cost
Total Program Element (PE) Cost	8,522	7,361	0	0	0	0	0	0	Continuing	TBD
2810 Advanced Image/Information/Optical Memory Technology Applications	5,884	4,328	0	0	0	0	0	0	Continuing	TBD
2863 Integrated Photonics	2,638	0	0	0	0	0	0	0	Continuing	TBD
4850 Collaborative C2	0	3,033	0	0	0	0	0	0	Continuing	TBD
Quantity of RDT&E Articles	0	0	0	0	0	0	0	0	0	0

Note: Prior to FY 2001, the efforts in Project 4850 were performed in PE 0603253F, Projects 632735 and 63666A. In FY 2001, efforts in Project 2863 move into PE 0603203F, Project 665A. In FY 2002, efforts in Projects 2810 and 4850 move into PE 0603789F, Project 4072 and 4925, respectively, as part of the Air Force Science and Technology PE realignment. FY 2003 - FY 2007 budget numbers do not reflect the DoD strategy review results.

(U) **A. Mission Description**
 This program develops and demonstrates Aerospace Command, Control, Communications, and Intelligence (C3I) technologies for collaborative command and control (C2) with emphasis on a coalition/joint environment. This includes the areas of information and knowledge production, data fusion, data links, wideband storage, and processing, retrieval, and exploitation of C3I databases. A family of exploitation tools to extract information from multi-sensor data sources will be developed. An enabling fusion architecture to work with existing and future fusion engines will also be designed and built to correlate and integrate this information to produce a consistent knowledge of the battle space over a distributed and collaborative C2 environment. Information storage and retrieval technologies for secure global database distribution, of sufficient capacity and speed to meet Air Force requirements, will be developed. A collaborative C2 operations foundation between dispersed command centers will be developed to demonstrate split force operations and enable decision making in a distributed aerospace information framework.

(U) **B. Budget Activity Justification**
 This program is in Budget Activity 3, Advanced Technology Development, since it develops and demonstrates technologies for existing system upgrades and/or new system developments that have a military utility and address warfighter needs.

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE

June 2001

BUDGET ACTIVITY

03 - Advanced Technology Development

PE NUMBER AND TITLE

0603726F Aerospace Info Tech Sys Integration(U) **C. Program Change Summary (\$ in Thousands)**

	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>Total Cost</u>
(U) Previous President's Budget (FY 2001 PBR)	7,828	7,429	8,047	
(U) Appropriated Value	7,922	7,429		
(U) Adjustments to Appropriated Value				
a. Congressional/General Reductions				
b. Small Business Innovative Research	-187			
c. Omnibus or Other Above Threshold Reprogram	-180			
d. Below Threshold Reprogram	1,049			
e. Rescissions	-82	-68		
(U) Adjustments to Budget Years Since FY 2001 PBR			-8,047	
(U) Current Budget Submit/FY 2002 PBR	8,522	7,361	0	TBD

(U) **Significant Program Changes:**

In FY 2002, efforts in this PE moves to PE 0603789F, Project 4072 and 4925.

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)

DATE

June 2001

BUDGET ACTIVITY

03 - Advanced Technology Development

PE NUMBER AND TITLE

0603726F Aerospace Info Tech Sys Integration

PROJECT

2810

COST (\$ in Thousands)	FY 2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	Cost to Complete	Total Cost
2810 Advanced Image/Information/Optical Memory Technology Applications	5,884	4,328	0	0	0	0	0	0	Continuing	TBD

Note: In FY 2002, efforts in this project move into PE 0603789F, Project 4072.

(U) **A. Mission Description**

This project develops and demonstrates techniques and algorithms to meet weapon systems requirements for processed and fused multi-source information needed for mission planning, navigation, targeting, and terrain analysis. It provides generic language translation processing techniques, state-of-the-art algorithms for Air Force exploitation of digitally processed image and spatial (i.e., latitude, longitude, and elevation) database products, automated capabilities to reference and display hypermedia (multi-media) information, and defensive information warfare technologies. This project also develops erasable optical data storage systems with high capacity and fast input/output speed for fighter aircraft (to provide fast airborne access to mission-oriented data and the digital terrain system) and electronic surveillance aircraft (for on-board sensor data recording, operational mission planning requirements, and large data storage requirements (i.e., high-volume, soft-copy, digital imagery exploitation). Algorithms will be developed to automate the selection, retrieval, and downloading of information stored on mass storage devices that are distributed across the data network. Three-dimensional (3-D) memory systems will be developed for volumetric digital data storage. This new mass storage technology will demonstrate ultra-high data density and fast, parallel data access within a low-cost, compact system.

(U) **FY 2000 (\$ in Thousands)**

- (U) \$1,362 Developed and demonstrated advanced signal exploitation technologies. Developed and demonstrated advanced imagery and signal intelligence information, sensor fusion engine, and spatial database technologies to enhance warfighter mission planning, navigation, targeting, and terrain analysis. Developed and demonstrated a standard open fusion architecture with a sensor fusion capability to provide a complete and accurate representation in real-time of the current military situation.
- (U) \$1,442 Developed and demonstrated advanced data handling and event visualization technologies. Developed and demonstrated automated capabilities to locate, retrieve, process, distribute, and display intelligence and sensor data to improve the sensor exploitation process. Developed a decision support system to automate extraction, visualization, and analysis of information in text.
- (U) \$1,520 Developed and demonstrated advanced storage and memory technologies. Developed smart memory/associative recall information data handling, storage, and access technologies to enable advanced fusion processing techniques. Continued to develop and demonstrate optical disk and interface technologies that can be implemented in joint theater operations, including write-once, read-many devices.
- (U) \$1,560 Designed, developed, and demonstrated mission planning and rehearsal capabilities for theater battle management, including the demonstration of software for joint Command and Control (C2) requirements.

Project 2810

Page 3 of 9 Pages

Exhibit R-2A (PE 0603726F)

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)		DATE June 2001
BUDGET ACTIVITY 03 - Advanced Technology Development	PE NUMBER AND TITLE 0603726F Aerospace Info Tech Sys Integration	PROJECT 2810
<p>(U) <u>A. Mission Description Continued</u></p> <p>(U) <u>FY 2000 (\$ in Thousands) Continued</u></p> <p>(U) \$5,884 Total</p> <p>(U) <u>FY 2001 (\$ in Thousands)</u></p> <p>(U) \$1,130 Develop and demonstrate advanced signal exploitation technologies. Develop and demonstrate advanced imagery and signal intelligence information, adaptive sensor fusion engine, and spatial database technologies for transition to Common Operational Picture. Continue to develop planning and assessment technologies to support strategy development and campaign assessment in a distributed environment supporting the battlespace infosphere.</p> <p>(U) \$1,922 Develop and demonstrate advanced data handling and event visualization technologies. Develop and demonstrate automated capabilities to access, extract, process, and display multi-source intelligence and sensor databases to improve the sensor exploitation process for near-real-time situational awareness. Develop and demonstrate event visualization, natural language processing for information extraction, collaborative analysis tools, and situation assessment capability for decision support operations.</p> <p>(U) \$1,276 Develop and demonstrate advanced storage and memory technologies. Continue to develop smart memory and associative recall technologies for strategic and tactical applications. Continue development and demonstration of ultra-dense storage, and fast parallel access technologies for write-once, read-many, and erasable memories. This technology enhances sensor exploitation for increased situational awareness and interactive simulation for distributed mission training.</p> <p>(U) \$4,328 Total</p> <p>(U) <u>FY 2002 (\$ in Thousands)</u></p> <p>(U) \$0 Efforts move to PE 0603789F, Project 4072.</p> <p>(U) \$0 Total</p> <p>(U) <u>B. Project Change Summary</u></p> <p>Not Applicable.</p> <p>(U) <u>C. Other Program Funding Summary (\$ in Thousands)</u></p> <p>(U) Related Activities:</p> <p>(U) PE 0602702F, Command, Control, and Communications (C3).</p> <p>(U) PE 0603789F, C3I Advanced Development.</p> <p>(U) This project has been coordinated through the Reliance process to harmonize efforts and eliminate duplication.</p>		
Project 2810	Page 4 of 9 Pages	Exhibit R-2A (PE 0603726F)

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)		DATE
BUDGET ACTIVITY		PROJECT
03 - Advanced Technology Development	0603726F Aerospace Info Tech Sys Integration	2810
<p>(U) <u>D. Acquisition Strategy</u> Not Applicable.</p> <p>(U) <u>E. Schedule Profile</u> (U) Not Applicable</p> <p>.</p>		
Project 2810		

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)									DATE June 2001		
BUDGET ACTIVITY 03 - Advanced Technology Development					PE NUMBER AND TITLE 0603726F Aerospace Info Tech Sys Integration					PROJECT 2863	
COST (\$ in Thousands)	FY 2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	Cost to Complete	Total Cost	
2863 Integrated Photonics	2,638	0	0	0	0	0	0	0	Continuing	TBD	
<p>Note: In FY 2001, efforts in this project move into PE 0603205F, Project 665A.</p> <p>(U) <u>A. Mission Description</u> Current electronic systems are susceptible to electromagnetic interference, electromagnetic pulse, and radio frequency (RF) interference. Size constraints, speed, and reliability also limit traditional electronic systems. Photonics-based systems process information in the form of light (photonic) signals and will provide major improvements in tactical and strategic Command, Control, and Communications (C3) systems by enabling small-size, high-performance, high-capacity, survivable alternatives to electronic-based systems. This project develops and demonstrates advanced hardware technology in optical processing, adaptive transmission, and nonlinear optical processing.</p> <p>(U) <u>FY 2000 (\$ in Thousands)</u> (U) \$282 Developed, integrated, demonstrated, and tested analog and digital optical micro-network processing technologies and components to provide real-time data for pre- and post-mission analysis, as well as sensor integration and automatic target identification using multispectral surveillance systems for air and space platforms. (U) \$1,072 Developed and demonstrated microwave/millimeter-wave photonics processing and subsystems for advanced, optically-controlled, RF systems at increased frequencies. (U) \$700 Developed high performance control systems for RF phased array antennas providing extremely wide angle coverage, broadband performance, and anti-jam capability for Global Positioning System (GPS) applications. Continued to develop a photonics True Time Delay processor. (U) \$584 Completed development and demonstration of three-dimensional optical information data handling, storage, and access technologies including erasable and read-only memories. (U) \$2,638 Total</p> <p>(U) <u>FY 2001 (\$ in Thousands)</u> (U) \$0 Efforts move to PE 0603203F, Project 665A. (U) \$0 Total</p> <p>(U) <u>FY 2002 (\$ in Thousands)</u> (U) \$0 Efforts move to PE 0603203F, Project 665A. (U) \$0 Total</p> <p>Project 2863</p>											

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)		DATE June 2001
BUDGET ACTIVITY 03 - Advanced Technology Development	PE NUMBER AND TITLE 0603726F Aerospace Info Tech Sys Integration	PROJECT 2863
<p>(U) <u>B. Project Change Summary</u> Not Applicable.</p> <p>(U) <u>C. Other Program Funding Summary (\$ in Thousands)</u> (U) Related Activities: (U) PE 0602702F, Command, Control, and Communications (C3). (U) PE 0603789F, C3I Advanced Development. (U) PE 0603203F, Advanced Aerospace Sensors. (U) This project has been coordinated through the Reliance process to harmonize efforts and eliminate duplication.</p> <p>(U) <u>D. Acquisition Strategy</u> Not Applicable.</p> <p>(U) <u>E. Schedule Profile</u> (U) Not Applicable.</p>		
<p>Project 2863</p> <p>Page 7 of 9 Pages</p> <p>Exhibit R-2A (PE 0603726F)</p>		

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)									DATE June 2001		
BUDGET ACTIVITY 03 - Advanced Technology Development					PE NUMBER AND TITLE 0603726F Aerospace Info Tech Sys Integration					PROJECT 4850	
COST (\$ in Thousands)	FY 2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	Cost to Complete	Total Cost	
4850 Collaborative C2	0	3,033	0	0	0	0	0	0	Continuing	TBD	
<p>Note: In FY 2002, efforts in this project move into PE 0603789F, Project 4925.</p> <p>(U) <u>A. Mission Description</u> This project develops and demonstrates technologies for the next generation of distributed collaborative environments, which will provide cross disciplinary information to a decision maker when, where, and how it is needed. Technologies developed will permit advanced integrated information architectures for the near-real-time transfer of large volumes of information over existing and future command, control, and communications systems. The application of these new technologies will allow reconfiguration and adaptation of existing operational aerospace systems to support seamless integrated operations, and facilitate an affordable implementation of the battlespace infosphere concept. These are enabling technologies for collaborative command and control, simulation-based acquisition, and distributed mission training.</p> <p>(U) <u>FY 2000 (\$ in Thousands)</u> (U) \$0 Previously accomplished in PE 0603253F, Projects 2735 and 666A. (U) \$0 Total</p> <p>(U) <u>FY 2001 (\$ in Thousands)</u> (U) \$1,059 Develop and demonstrate next generation distributed collaborative environments. Assess and demonstrate the application of these technologies to simulation-based acquisition, pre-planning for distributed mission training, and problem solving for a lean and agile Expeditionary Aerospace Force. (U) \$974 Define and develop integrated aerospace information architectures. Define and develop integrated information architectures that enable information collection assets on airborne and space platforms to be automatically optimally tasked, and the collected information shared in near-real-time among expeditionary aerospace forces. Assess the application of these technologies to the time-critical target domain. Develop and demonstrate aerospace architecture technology to provide an affordable battlespace infosphere operation. This will allow reconfiguration and adaptation of existing operational aerospace systems to support seamless integrated operations. (U) \$1,000 Develop technology to increase aerospace platform information transfer capacity for exchange of time-critical threat, sensor, and command and control information between aircraft and cooperating space, airborne, and surface communication assets. Continue the development of communications technologies that support collaborative command and control. Complete a space-based air traffic communications and positioning brassboard demonstrating the capability to meet Federal Aviation Administration and International Civil Aviation Organization directed Global Air Traffic Management requirements in fighter and bomber aircraft. (U) \$3,033 Total</p> <p>Project 4850</p>											

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)		DATE June 2001
BUDGET ACTIVITY 03 - Advanced Technology Development	PE NUMBER AND TITLE 0603726F Aerospace Info Tech Sys Integration	
PROJECT 4850		
<p>(U) <u>A. Mission Description Continued</u></p> <p>(U) <u>FY 2002 (\$ in Thousands)</u></p> <p>(U) \$0 Efforts move to PE 0603789F, Project 4925.</p> <p>(U) \$0 Total</p> <p>(U) <u>B. Project Change Summary</u> Not Applicable.</p> <p>(U) <u>C. Other Program Funding Summary (\$ in Thousands)</u></p> <p>(U) Related Activities:</p> <p>(U) PE 0602702F, Command, Control, and Communications (C3).</p> <p>(U) PE 0603789F, C3I Advanced Development.</p> <p>(U) This project has been coordinated through the Reliance process to harmonize efforts and eliminate duplication.</p> <p>(U) <u>D. Acquisition Strategy</u> Not Applicable.</p> <p>(U) <u>E. Schedule Profile</u></p> <p>(U) Not Applicable.</p>		
<div style="display: flex; justify-content: space-between; margin-top: 20px;"> Project 4850 Page 9 of 9 Pages Exhibit R-2A (PE 0603726F) </div>		